

Amendments to the Claims

This listing of the Claims will replace all prior versions and listings of the claims in this patent application.

Listing of the Claims

1-20. (canceled)

21. (currently amended) An interconnect structure comprising:

a semiconductor structure having a first dielectric layer and a lower interconnect in said first dielectric layer;

a passivation layer over said first dielectric layer and said lower interconnect;

a stack dielectric layer over said passivation layer; and

an upper interconnect through said stack dielectric layer and said passivation layer contacting said lower interconnect and having sidewalls consisting of an interface layer comprised of copper sulfide wherein said copper sulfide directly contacts said stack dielectric layer.

22. (previously presented) The interconnect of claim 21, wherein said stack dielectric layer consists of one dielectric layer.

23. (previously presented) The interconnect of claim 21, wherein said stack dielectric layer is comprised of a second dielectric layer and a third dielectric layer.

24. (previously presented) The interconnect of claim 21, wherein a metal forms said upper interconnect.

25. (previously presented) The interconnect of claim 23, wherein there is an etch stop layer between said second and third dielectric layers.

26. (currently amended) The interconnect of claim 21, wherein a cap layer is on said stack dielectric layers.

27. (previously presented) The interconnect of claim 21, wherein said lower interconnect is comprised of one or more conductors from a group containing copper, aluminum, aluminum alloy, tungsten, titanium, titanium nitride, tantalum nitride, and tungsten nitride.

28. (previously presented) The interconnect of claim 21, wherein said lower interconnect is copper.

29. (previously presented) The interconnect of claim 21, wherein the dielectric layers are one of the following:

- a. non-porous undoped silicon oxide,
- b. porous undoped silicon oxide,

- c. non-porous doped silicon oxide,
- d. porous doped silicon oxide,
- e. non-porous organic material, porous organic material,
- f. non-porous doped organic material,
- g. porous doped organic material,
- h. phosphosilicate glass, or
- i. SiO₂.

30. (previously presented) The interconnect of claim 21, wherein said passivation layer is one of the following:

- a. silicon nitride,
- b. silicon oxynitride,
- c. silicon carbide, or
- d. boron nitride.

31. (canceled)

32. (previously presented) An interconnect structure comprising:

- a semiconductor structure having a first dielectric layer and a lower interconnect in said first dielectric layer;
- a passivation layer over said first dielectric layer and said lower interconnect;
- a stack dielectric layer over said passivation layer; and

an upper interconnect through said stack dielectric layer and said passivation layer contacting said lower interconnect and having an interface layer comprised of copper sulfide only on sidewalls of said upper interconnect.

33. (previously presented) The interconnect of claim 32, wherein said stack dielectric layer consists of one dielectric layer.

34. (previously presented) The interconnect of claim 32, wherein said stack dielectric layer is comprised of a second dielectric layer and a third dielectric layer.

35. (previously presented) The interconnect of claim 32, wherein a metal forms said upper interconnect.

36. (previously presented) The interconnect of claim 34, wherein there is an etch stop layer between said second and third dielectric layers.

37. (previously presented) The interconnect of claim 32, wherein a cap layer is on said stack dielectric layer.

38. (previously presented) The interconnect of claim 32, wherein said lower interconnect is comprised of one or more conductors from a group containing copper, aluminum, aluminum alloy, tungsten, titanium, titanium nitride, tantalum nitride, and tungsten nitride.

39. (previously presented) The interconnect of claim 32, wherein said lower interconnect is copper.

40. (previously presented) The interconnect of claim 32, wherein the dielectric layers are one of the following:

- a. non-porous undoped silicon oxide,
- b. porous undoped silicon oxide,
- c. non-porous doped silicon oxide,
- d. porous doped silicon oxide,
- e. non-porous organic material, porous organic material,
- f. non-porous doped organic material,
- g. porous doped organic material,
- h. phosphosilicate glass, or
- i. SiO₂.

41. (previously presented) The interconnect of claim 32, wherein said passivation layer is one of the following:

- a. silicon nitride,
- b. silicon oxynitride,
- c. silicon carbide, or
- d. boron nitride.